

CLAIMS

1. A connector for use in electrically insulating a portion of a high voltage device, comprising a dielectric material that is pre-formed to attach to a corresponding surface of the high voltage device, the pre-formed dielectric material further defining a receptacle cavity through which an electrode can electrically connect to the high voltage device.

2. A connector as defined in claim 1, further comprising a main cavity defined by the pre-formed dielectric material, the cavity receiving the corresponding surface of the high voltage device such that the surface is electrically insulated from the electrode.

3. A connector as defined in claim 2, wherein the receptacle cavity of the connector is in physical communication with the main cavity.

4. A connector as defined in claim 2, further comprising a bleeding hole extending from an outer surface of the pre-formed dielectric material to the main cavity.

5. A connector as defined in claim 1, wherein the dielectric material is composed of a silicone adhesive.

6. A connector as defined in claim 1, wherein the high voltage device comprises an x-ray tube.

7. An x-ray tube, comprising:

an evacuated enclosure containing a cathode with an electron source that is capable of producing electrons and an anode having a target surface that is positioned to receive the electrons produced by the electron source;

a high voltage electrode configured to electrically connect with a cathode receptacle positioned on the surface of the evacuated enclosure, the receptacle being configured to provide a high voltage potential to the cathode; and

a connector configured to enable the high voltage electrode to electrically connect with the cathode receptacle, the connector being pre-formed from a dielectric material before attachment to the evacuated enclosure to include a cavity that is sized to receive a specified portion of the evacuated enclosure that is proximate the cathode receptacle.

8. An x-ray tube as defined in claim 7, wherein the cavity further comprises a main cavity portion that receives the specified portion of the evacuated enclosure and a receptacle cavity portion that receives the electrode when the connector is attached to the evacuated enclosure.

9. An x-ray tube as defined in claim 8, wherein the connector is attached to the evacuated enclosure such that the receptacle cavity portion is aligned with the cathode receptacle, and wherein the electrode is received within the receptacle cavity portion when the electrode is attached to the cathode receptacle.

10. An x-ray tube as defined in claim 8, wherein the receptacle cavity portion is integrally formed with the connector.

11. An x-ray tube as defined in claim 8, wherein the portion of the connector defining the receptacle cavity portion is pre-formed and attached to a pre-formed portion of the connector defining the main cavity portion.

12. An x-ray tube as defined in claim 7, wherein the evacuated enclosure comprises first and second segments that are hermetically joined to form the evacuated enclosure, the cathode receptacle being disposed on the first segment that substantially contains the cathode.

13. An x-ray tube as defined in claim 12, wherein the connector is physically affixed to the evacuated enclosure.

14. An x-ray tube as defined in claim 14, wherein a lubricant is used to assist the attachment of the connector to the evacuated enclosure.

15. An x-ray tube as defined in claim 14, further comprising a second connector configured to enable a second electrode to electrically connect with an anode receptacle located on the evacuated enclosure, the second connector being pre-formed from a dielectric material before attachment to the evacuated enclosure to include a cavity that is sized to receive a specified portion of the evacuated enclosure that is proximate the anode receptacle.

16. An x-ray tube as defined in claim 14, wherein the second connector includes an x-ray absorptive component.

17. An x-ray tube as defined in claim 7, wherein the first connector includes an x-ray absorptive component.

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18. An x-ray tube, comprising:

an evacuated enclosure containing a cathode with an electron source that is capable of producing electrons and an anode having a target surface that is positioned to receive the electrons produced by the electron source;

a high voltage electrode configured to electrically connect with an anode receptacle positioned on the surface of the evacuated enclosure, the anode receptacle being configured to provide a high voltage potential to the anode; and

a connector configured to enable the high voltage electrode to electrically connect with the anode receptacle, the connector being pre-formed from a dielectric material before attachment to the evacuated enclosure to include a cavity that is sized to receive a specified portion of the evacuated enclosure that is proximate the anode receptacle.

19. An x-ray tube as defined in claim 18, wherein the cavity further comprises a main cavity portion that receives the specified portion of the evacuated enclosure and a receptacle cavity portion that receives the electrode when the connector is attached to the evacuated enclosure.

20. An x-ray tube as defined in claim 19, wherein the connector is attached to the evacuated enclosure such that the receptacle cavity portion is aligned with the anode receptacle, and wherein the electrode is received within the receptacle cavity portion when the electrode is attached to the anode receptacle.

21. An x-ray tube as defined in claim 19, wherein the receptacle cavity portion is integrally formed with the connector.

22. An x-ray tube as defined in claim 19, wherein the portion of the connector defining the receptacle cavity portion is pre-formed and attached to a pre-formed portion of the connector defining the main cavity portion.

23. An x-ray tube as defined in claim 18, wherein the evacuated enclosure comprises first and second segments that are hermetically joined to form the evacuated enclosure, the anode receptacle being disposed on the second segment that substantially contains at least a portion of the anode.

24. An x-ray tube as defined in claim 23, wherein the connector is physically affixed to the evacuated enclosure.

25. An x-ray tube as defined in claim 24, wherein a lubricant is used to assist the attachment of the connector to the evacuated enclosure.

26. An x-ray tube as defined in claim 25, further comprising a second connector configured to enable a second electrode to electrically connect with a second receptacle located on the evacuated enclosure, the second connector being pre-formed from a dielectric material before attachment to the evacuated enclosure to include a cavity that is sized to receive a specified portion of the evacuated enclosure that is proximate the second receptacle.

27. An x-ray tube as defined in claim 18, wherein at least a portion of the high voltage electrode is permanently incorporated within the connector during formation of the connector.

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28. A method of attaching a high voltage supply to an x-ray tube, the x-ray tube including an evacuated enclosure containing a cathode and an anode, the method comprising:

pre-forming a dielectric material into a connector, the connector defining a cavity comprising a receptacle cavity and a main cavity, the main cavity being sized to receive a corresponding portion of the surface of the evacuated enclosure on which a receptacle is defined;

joining the connector to the corresponding portion of the surface of the evacuated enclosure such that the receptacle cavity aligns with the receptacle; and

attaching a high voltage electrode to the receptacle of the evacuated enclosure, the electrode being at least partially disposed within the receptacle cavity of the connector.

29. A method of attaching as defined in claim 28, wherein the receptacle is electrically connected to the cathode.

30. A method of attaching as defined in claim 28, wherein the receptacle is electrically connected to the anode.

31. A method of attaching as defined in claim 28, further comprising:

before joining the connector to the corresponding portion of the surface of the evacuated enclosure, applying a lubricant to at least one of the main cavity and the surface of the evacuated enclosure.

32. A method of attaching as defined in claim 28, wherein the main cavity and receptacle cavity are in physical communication with one another.

33. A method of attaching as defined in claim 28, wherein joining the connector further comprises:

utilizing a bleeding device to allow the escape of air from the receptacle cavity.

34. A connector assembly for use with an x-ray tube, comprising:

A connector that is pre-formed from a dielectric material, the connector including a cavity that receives a corresponding portion of an evacuated enclosure of the x-ray tube; and

A receptacle sleeve that is permanently received by the connector, the receptacle sleeve being configured to receive a high voltage electrode that electrically connects with the x-ray tube.

35. A connector assembly as defined in claim 34, wherein at least a portion of the receptacle sleeve is incorporated within the connector during formation of the connector.

36. A connector assembly as defined in claim 35, further comprising a heat dissipating element that is operably connected to the connector to remove heat from the x-ray tube.

37. A connector assembly as defined in claim 36, wherein the heat dissipating element includes a conductive mount that is permanently connected to the connector as to extend into the cavity.

38. A connector assembly as defined in claim 37, above, wherein the conductive mount includes boron nitride to enhance heat dissipation characteristics of the conductive mount.

39. A connector assembly as defined in claim 34, wherein the high voltage electrode does not physically connect with the evacuated enclosure.

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